

## How Farmers Use Commodity Programs

Farmers may use nonrecourse loans and the farmer-owned grain reserve to transfer price risks to the public sector. For example, in 1982 an eligible corn farmer could receive a nonrecourse loan of \$2.55 per bushel or choose to place corn in the reserve at a loan rate of \$2.90 per bushel, and in addition receive an annual storage payment of 26.5 cents per bushel. These programs assured participating farmers that the prices they received would not fall below the loan rates; thus, the programs reduced downside price risks.

In addition, deficiency payments help support incomes when market prices fall below target prices; these payments transfer some of the income risks to the public sector. For example, in 1982 an eligible corn farmer received a deficiency payment of 15 cents per bushel, the difference between the target price of \$2.70 per bushel and the nonrecourse loan rate. These income transfers, however, are generally small for most producers since they are distributed in proportion to the volume of production. In crop year 1981, about 6 percent of those (typically larger) producers participating in the wheat, feed grains, and upland cotton programs received about 57 percent of total deficiency payments under these programs--an average payment per individual of \$10,824 as compared to \$551 for all other smaller participants. <sup>3/</sup> On a per farm basis, the largest proportion of direct government payments goes to those farms with annual sales of farm products of \$40,000 or more. In recent years this group (about 28 percent of all farms) has received roughly 70 percent of such payments. <sup>4/</sup>

## Changes in Commodity Programs

Current commodity programs are the product of a long-term transition in policy that began in the late 1950s and was embodied in the Food and Agriculture Act of 1965. The basic policy approach was to reduce price supports to world price levels or below and to make direct payments to farmers to encourage them to participate in voluntary supply control programs. The transition in commodity policy was evident in the 1965-1970 period, when average real (adjusted for inflation) price supports for wheat, corn, and upland cotton were nearly 50 percent below those of 1955. The

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3. Unpublished data from the United States Department of Agriculture.
  4. U.S. Department of Agriculture, Economic Indicators of the Farm Sector: Income and Balance Sheet Statistics, 1981, ECIFS 1-1 (August 1982).

lowering of price supports (domestic prices) encouraged exports and permitted the eventual elimination of export subsidies. As shown in Table 2, income support payments from the mid-1960s to the early 1970s averaged about \$2.1 billion annually and were an important part of crop farmers' incomes. At the same time, a significant proportion of acreage was being diverted to conservation uses--about 20 percent of total cropland.

During the 1970s, an explosion in agricultural exports reduced the importance of commodity programs to crop farmers' incomes. Real price supports continued to decline, and from crop years 1974 through 1980 income-support payments to crop farmers totaled \$3.5 billion, mostly for the 1978 and 1979 crop programs, averaging only about 25 percent of earlier annual levels (see Table 2). <sup>5/</sup> Moreover, during 1974-1980 cropland diversion programs were implemented only in 1978 and 1979 (on a small scale). Federal price support outlays for crop programs averaged about \$1.7 billion annually over fiscal years 1975-1981, about two-thirds what they had been in 1966-1970. <sup>6/</sup> This reduction in outlays was a manifestation of changes both in policy and in market demand.

Despite the changes in policy, taxpayers are still exposed to very large outlays when domestic crop supplies are excessive relative to government price support levels and export demand. This has been the case in recent years; crop price support outlays were nearly \$9 billion in 1982 and \$13.1 billion in 1983. The principal reasons for the contraction in export demand in the early 1980s were worldwide economic and financial problems, the appreciation of the dollar against other currencies, political tensions between the United States and the USSR, and high U. S. price support levels for grains. <sup>7/</sup>

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5. These data exclude disaster payments. The payments were mainly deficiency payments, but the total includes some diversion payments for 1978 and 1979. Payment data are from the annual Report of Financial Conditions and Operations of the Commodity Credit Corporation, United States Department of Agriculture.
  6. Price support outlays included mainly deficiency payments, disaster payments, and commodity loans. These outlays were only for wheat, feed grains, rice, and upland cotton. They averaged about two-thirds of total annual price support outlays for all commodities.
  7. See Congressional Budget Office, Agricultural Export Markets and the Potential Effects of Export Subsidies (June 1983).

**TABLE 2. NET PRICE SUPPORT OUTLAYS FOR WHEAT, FEED GRAINS, RICE, AND UPLAND COTTON PROGRAMS, BY FISCAL YEAR**  
(In millions of dollars)

Year	Income Support Payments	Other <u>a/</u>	Total
Average 1966-1970	1,931	356	2,287
Average 1971-1974	2,278	-143 <u>b/</u>	2,135
1975	5	428	433
1976	2	357	359
1977	129	2,683	2,812
1978	1,741	1,580	3,321
1979	1,560	87	1,647
1980	136	2,017	2,153
1981	--	1,370	1,370
1982	--	8,989	8,989
1983	3,791	9,309	13,100

SOURCE: Congressional Budget Office from U. S. Department of Agriculture data.

a. Mainly commodity loans.

b. Minus denotes net receipts.

#### Commodity Policy and the Sharing of Farming Risks

Because the transition in commodity policy has reflected the view that farmers should depend on markets for adequate prices and incomes--a view

that was accommodated by an expansion in export demand--farm programs today are less supportive of prices and incomes than in the past. This is so for several reasons. First, the extent to which these voluntary programs can in themselves measurably increase prices and incomes is determined in part by the number of farmers who participate. A farmer decides whether to participate in commodity programs according to his expectations of relative economic outcomes. If no acreage reductions are required as a condition of eligibility, there are no real costs in participating. On the other hand, if acreage adjustments are required then he must assess the costs of idling acreage in exchange for the program benefits. Normally, many farmers decide against participating, presumably with the expectation of receiving adequate prices and earning satisfactory incomes without it. As a result, in periods of surplus crops, commodity programs typically do not induce enough farmers to remove sufficient acreage to reduce production and increase prices significantly, but can result in large outlays to finance participating farmers' inventories.

Second, with respect to income levels, the effect of farm programs on income levels is uncertain. Unless acreage diversion raises farm prices enough to offset reduced output, it will not lead to higher incomes (excluding government payments).

Third, apart from the recent changes in farm policy, the power of commodity programs to increase prices and incomes has decreased because farmers' economic fortunes are now strongly influenced by changes in the domestic and international economies--largely beyond the influence of farm programs.

In sum, changes in policy and the growing dependence upon international markets lead to two important conclusions about commodity programs: (1) they are less able than formerly to increase the level of farm prices and incomes; and (2) they have limited capacity to moderate fluctuations in incomes caused by international events and conditions. Recent events demonstrate that marginal adjustments under current programs can do little to protect farmers against the effects of unanticipated changes in export demand resulting from good crops abroad, poor economic conditions worldwide, a strong U. S. dollar, and other nations' policies. Furthermore, it is clear that increases in U. S. prices act to discourage foreign consumption of U. S. crops and to encourage foreign production. To the extent that commodity programs raise farm prices, they can work to the disadvantage of U. S. farmers and taxpayers.

Today's commodity programs, in comparison to those of the 1950-1972 period, represent a reduction in the sharing of farming risks by the public sector. There is general agreement that farm prices and incomes are less

variable than would be the case if there were no commodity programs. There is, however, a growing realization that commodity policy that focuses on price stabilization can be a costly and ineffective way to reduce income instability stemming from global weather and economic, trade, and foreign policies.

### Crop Insurance

Federal crop insurance, which has been in existence in some form since the late 1930s, helps farmers to reduce income instability from production losses. The program provides all-risk insurance that covers unavoidable physical losses from adverse weather conditions, insects, plant diseases, and other causes. The federal government provides this insurance because private insurance companies cannot cope with the large variability in annual losses.

Federal crop insurance guarantees a farmer a specific amount of production; if he harvests less than the guaranteed amount as a result of insurable causes, he is paid for the shortage at one of three preselected price options per commodity unit. A farmer may also choose one of three levels of yield coverage--50, 65, or 75 percent. Premiums vary directly with the level of yield guaranteed and the price selection, and risks are determined on the basis of yield data for individual farms, counties, or areas within counties. Starting with the 1981 crops, premiums were subsidized by 30 percent on coverage up to 65 percent of average production. Operating and administrative expenses continue to be fully subsidized.

The Federal Crop Insurance Act of 1980, which authorized the premium subsidies, aims to expand federal crop insurance to make it the primary form of federal production protection. In crop year 1981, the expanded program insured nearly three-fourths more acreage than in 1980, or about 13 percent of the U. S. total. In crop year 1982 about 15 percent of U. S. cropland was insured. The Federal Crop Insurance Corporation (FCIC) intends eventually to assure that all farmers producing the major crops can purchase crop insurance. It also intends to make increasing use of private insurance companies and agents in selling the insurance.

Federal outlays for crop insurance include: (1) administrative and operating expenses, (2) indemnities in excess of premium income; and (3) premium subsidies. Outlays averaged about \$26 million yearly in fiscal years 1977-1981. With the expansion of the program, outlays have risen and are estimated at \$308 million in fiscal year 1983.

Farmers have not yet participated extensively in federal crop insurance. There appear to be two basic reasons for this. First, other federal disaster programs furnish a disincentive to participation in federal crop insurance. For example, disaster payments were made to producers of wheat, feed grains, rice, and upland cotton for the 1974 through 1981 crops, and to upland cotton producers in 1982. These payments, which amounted to free insurance, averaged nearly \$500 million per year over the period. Emergency disaster loans, at highly subsidized interest rates, were also available to many farmers. Now, however, disaster payments have generally been terminated and interest rates for disaster loans have been increased. <sup>8/</sup>

Second, a farmer's decision to buy crop insurance depends both on his attitude toward risks and his view of yield variability. A farmer who assigns a very low probability to yields below 75 percent of normal is unlikely to participate. For this reason, some farmers are unlikely ever to purchase federal crop insurance.

Nevertheless, federal crop insurance can be an effective option for managing production risks. And premium subsidies are an incentive for some farmers to buy insurance who would not otherwise do so. Where one would expect long-run insurance benefits (indemnities) to be roughly equal to insurance costs (premiums), premium subsidies reduce a farmer's insurance costs and thus increase his long-term net benefits. Moreover, crop insurance in one year of bad weather can pay indemnities great enough to offset many years of premiums.

### POLICY IMPLICATIONS

A case can be made that the nation still has an interest in policies that help farmers manage their risks. Indeed, federal policy has long acknowledged this viewpoint even as changes in commodity programs reduced the level of risk assumed by the public sector and increased farmers' dependence on markets. While such a policy transition was appropriate in itself, the result is a set of commodity programs that are costly to taxpayers and often not used by farmers, and that are not very effective in reducing income instability arising from unanticipated changes in the demand for U. S. farm products overseas. It is from this viewpoint that alternative public policies for stabilizing incomes need to be examined. The next chapter looks at one such alternative--farm revenue insurance.

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8. The Agriculture and Food Act of 1981 gives the Secretary of Agriculture the authority to make disaster payments under certain circumstances, but they are no longer mandatory.

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## CHAPTER III. FARM REVENUE INSURANCE AS A NEW APPROACH TO RISK MANAGEMENT

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The basic objective of insurance is to share the risk of loss among a large number of similarly exposed individuals. Even though each individual's exposure to misfortune may be quite unpredictable, the risk for the group as a whole can be estimated with a fair degree of accuracy. Because the risk is pooled, an individual can obtain protection at a relatively small cost. In addition to distributing the burden of loss over individuals, insurance distributes losses over time through the accumulation of reserves.

### FARM REVENUE INSURANCE 1/

A farm revenue insurance program would seek to protect crop farmers against the risk of highly variable incomes. It would do so by guaranteeing a farmer that annual revenue per acre for specific crops would be no less than some proportion of average or expected revenues. Revenues, or gross income, would be insured rather than net income. (Insuring net incomes would require taking account of differences in production costs among farmers, as well as covering input price risks.) Farmers would have an incentive to reduce average per unit costs, however, in order to increase the net income associated with any level of insured revenues.

The current federal crop insurance program is a limited form of revenue insurance--it insures against low revenues resulting from produc-

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1. It is important to understand that the policy objective of farm revenue insurance is to reduce the year-to-year variability in crop farmers' incomes. Implicit in this objective is the expectation that average incomes over time, although highly variable, will generate adequate returns to resources in agriculture. Farm revenue insurance as outlined in this chapter is considered as either a replacement for current price support programs or a complement to current programs redirected to a price stabilization objective. If the policy objective is to increase the average level of income over time, then farm revenue insurance is not an appropriate policy tool--it is designed to reduce the variability about a mean level of revenues, not to increase the mean.

tion losses. 2/ Revenue insurance would extend this to cover low revenues resulting from price changes.

The farm revenue insurance program outlined below has two important limitations:

- o It would serve to stabilize incomes, but not to raise their general level.
- o It would not provide a high enough level of protection to make farming virtually risk-free. It would only protect against revenue shortfalls beyond a normal range of variation.

#### A Prototype of a Farm Revenue Insurance Program

Revenue insurance in a simple form as an extension of crop insurance could work as follows. A corn farmer might insure 75 percent of average revenues per acre on the basis of recent experience--the insured level being below the normal range of variation. With historical revenues averaging, say, \$270 per acre and a corn crop of 100 acres, the insured level of revenues would be \$20,250 (75 percent of \$27,000). If revenue from the corn crop was less than \$20,250, the farmer would receive an indemnity equal to the difference. It would be difficult to determine actual revenues for every insured farmer because prices received vary widely among farmers due to differences in pricing and marketing strategies. Instead, revenues would be estimated for each farmer from average state or local prices, and from actual farm yields.

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2. For example, suppose that a farmer has 100 acres of corn with average yields of 100 bushels per acre. At maximum federal crop insurance coverage, he can insure 75 percent of his average production, or 7,500 bushels. To value the physical coverage, he selects a price of \$2.70 per bushel (there is a choice of three prices, and premiums increase with prices). If production is below 7,500 bushels, the farmer will receive an indemnity equal to the difference between actual output and 7,500 bushels valued at \$2.70 per bushel. If production is only 5,000 bushels, the indemnity will be \$6,750 (2,500 bushels x \$2.70 per bushel). In the event of a total crop failure, the indemnity will be \$20,250 (7,500 bushels x \$2.70 per bushel). In the latter case, the indemnity will represent his total revenue. In the former case, total revenue includes the indemnity plus sales receipts from 5,000 bushels.



If an isolated natural hazard such as hail reduced a farmer's corn crop, his revenue insurance would work in a way similar to federal crop insurance. With a total crop failure the indemnity would be \$20,250. If the farmer's yield was only 60 percent of average, making his estimated revenue approximately 60 percent of average, or \$16,200 (100 acres x \$270 x .60), he would receive an indemnity of \$4,050 (\$20,250 less \$16,200) to bring his estimated revenue up to the insured level. Indemnities in both these examples are triggered by production losses from isolated causes.

But widespread production losses--resulting from drought, for example--would probably act to increase average prices because of the negative correlation between yields and prices.<sup>3/</sup> Increased prices would offset to some extent reduced production and obviate the need for indemnities. For example, in the case where yields fall to 60 percent of the historical average, average prices might rise to levels 45 to 50 percent higher than in the past. This would result in revenues greater than the insured level, despite the loss in production. In such a case there would be no indemnity. Unlike crop insurance, which would pay indemnities in the event of widespread production losses, revenue insurance would consider the effects of prices on estimated revenues.

On the other hand, revenue insurance might pay indemnities if yields were higher, causing market prices to fall. This would most likely happen in a year following a one- or two-year period of large crops. In such a year, continued above-average yields could cause prices to fall far enough so that average revenues per acre would be less than the insured level.

Moreover, a revenue insurance program would take into account the influence of demand on prices. Farmers would be protected against export contractions that caused prices and revenues to fall. By the same token, they would not be indemnified if a surge in exports raised prices enough to bring revenues above their insured levels.

In summary, the revenue insurance option described above would guarantee a farmer that revenues per crop would not fall below a minimum level regardless of whether production or prices were the cause of revenue shortfalls. In exchange for this guarantee, the farmer would pay an annual premium. Under an ideal insurance scheme, his long-run premiums would approximate his indemnity payments so that his average annual revenue

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3. State data tend to support this conclusion. Statistical analyses of 1972-1980 state average yield and price data indicate that yields and prices were negatively correlated in most of the major corn, soybean, wheat, and cotton states.

(considering premiums and indemnities) would be the same as in the absence of insurance. But the insurance would reduce year-to-year variability in revenues, increasing them through indemnities in poor years and reducing them through premium payments in all other years.

## POTENTIAL CONSEQUENCES OF FARM REVENUE INSURANCE

How would revenue insurance affect farm prices, incomes, crop inventories, resource allocation, and federal outlays? The following section attempts a rough assessment of the potential consequences of the program by (1) comparing it with current policy, assuming that revenue insurance replaces current programs; and (2) examining revenue insurance as a complement to current programs that focus on price stabilization.

### Farm Revenue Insurance as a Replacement for Current Policy

Revenue insurance might have a number of advantages over current programs. First, the government would not directly influence prices, production, and the allocation of supplies by subsidizing farmers' inventories as it now does under commodity programs. Second, crop farmers' revenues would be less variable from year to year. And third, total federal costs might be lower with revenue insurance than under the current set of commodity programs. On the other hand, in stabilizing incomes rather than prices and supplies, farm revenue insurance would allow greater swings in farm product prices (and therefore in prices paid by consumers) than current programs. A government-held grain reserve could help to prevent sharp price increases and commodity shortages.

Prices. Crop prices would probably be more variable from year to year and within each year without the price stabilization features of current commodity programs. Prices might be expected to fall more in surplus periods without the price floors set by nonrecourse loans and reserve loans. Grain prices would tend to increase more in tight supply periods if there were no reserves to dampen price increases. Consumers might feel the impact of greater price instability and more uneven market supplies, depending on the level of stocks carried by farmers and those firms involved in grain processing, manufacturing, and exporting. Farmers most likely would carry smaller inventories without the current financial incentives that make it less costly to hold stocks. Furthermore, in the absence of nonrecourse loans and the reserve, the government would not have to carry stocks because it would no longer be the buyer of last resort. If farmers and the government held smaller stocks, then processing, manufacturing, and exporting firms would have to consider whether to increase their usual inventories to assure stable supplies.

Under revenue insurance the federal government would be less a source of uncertainty and instability, since it would not influence markets as it does under current programs. Nevertheless, as suggested above, public policy would have to address price instability in some manner. One means of reducing price instability and protecting consumers against shortages would be to establish a reserve, perhaps owned by the government or held by farmers under government control.

Although crop prices would tend to be more variable under revenue insurance, the average level might not change substantially. Many analysts believe that the long-term average level of market prices has not been much increased by price support programs--a view supported in part by experience in the 1970s. But if revenue insurance raised output by reducing farmers' risk more than current programs do, average prices might tend to be somewhat lower. For at least two reasons, however, it seems unlikely that the level of aggregate output would be significantly greater with revenue insurance. Commercial crop farmers are already highly specialized and capitalized; they would not be likely to increase their output unless they perceived that farm revenue insurance would further reduce their risks as compared to current programs. Even if they did, participation would have to be high to affect aggregate output.

Incomes. Crop farmers' revenues, or gross incomes, would be less variable from year to year because revenue insurance would smooth out the sharp swings. Average revenue levels, as compared to those under current programs, would be influenced by prices, production, and revenue insurance premiums. If revenue insurance induced more production and lower prices, then average revenues would tend to be smaller. This would happen because the quantity demanded would increase less, in relative terms, than prices would decline. In addition, the insurance premiums paid by farmers would reduce net revenues. Therefore, as compared to current policies, crop farmers might experience slightly lower but more stable revenues under farm revenue insurance--although it is conceivable that reduced uncertainty might contribute to improved productivity and thus increase net incomes.

Federal Outlays. Federal outlays for revenue insurance would be dependent upon: (1) specific insurance provisions; (2) the level of insurance coverage; (3) subsidy levels; and (4) farmer participation. Because of these factors, it is difficult to compare the costs of revenue insurance with the costs of continuing current programs. Under the broad conditions outlined in the next section--accepting the present average level of nominal income, insuring for only below-normal revenue shortfalls, and assuming effective program management--it is likely that revenue insurance would cost less than the projected costs (\$7-\$8 billion) of continuing current programs.

This tentative conclusion is based upon several considerations. First, under current programs, 30 to 40 percent of price support outlays are for price stabilization activities--nonrecourse loans, the farmer-owned grain reserve, and related expenditures. Farm revenue insurance would not require these outlays, although there might be some costs for a reserve to protect consumers. Second, the administrative and operating expenses of a farm revenue insurance program probably would be no more than those incurred for current price support and crop insurance programs. Third, some portion of the program costs could be passed to farmers through insurance premiums. Of course, the level of premium subsidy would be the subject of debate, just as are the levels of price and income support under current programs.

Other Effects. If revenue insurance reduced farmers' income variability, this would probably improve their access to capital. Agricultural lenders are increasingly concerned about farmers' ability to meet debt obligations from cash incomes. Farmers, particularly those who have limited access to capital because they are relatively small or are new entrants, could use revenue insurance as a means to assure the capacity to meet debt obligations. Most likely, lenders would view revenue insurance as reducing farmers' risk and improving their creditworthiness.

#### Farm Revenue Insurance as a Complement to Price Stabilization Policies

The replacement of current programs with farm revenue insurance would be a dramatic policy change. As an alternative, revenue insurance could be used to complement price support programs that have the principle objective of price stabilization. As compared to current policy, the major features of a price stabilization approach would be: (1) a much wider price range; (2) flexible loan rates to assure the competitiveness of U.S. products in international markets; (3) smaller government-owned and farmer-owned reserve stocks; (4) less frequent acreage reduction programs; and (5) much smaller income transfers through deficiency payments. In other words, price supports would be maintained but the government would allow a much greater variation in prices before it intervened to protect relatively low price floors and high price ceilings. Since the emphasis would be on stabilizing prices, as opposed to increasing average prices, taxpayer costs would be less than under current policy.

Farm revenue insurance would protect farmers against income variability. If used as a complement to price stabilization policies rather than a replacement of them, it might have two advantages. First, prices would be less unstable. This would benefit consumers. Second, in conjunction with it, supply management via acreage reduction could be used to raise short-term

incomes. A disadvantage of using revenue insurance in this manner is that existing programs would still have the potential for high taxpayer costs if they were used to increase, rather than stabilize, farm incomes.

## PRACTICAL CHALLENGES TO FARM REVENUE INSURANCE

A workable farm revenue insurance program would have to be carefully designed to meet certain practical problems.

Insurance Problems. From an insurance perspective, perhaps the main challenge to revenue insurance is the difficulty of measuring revenue risks and predicting the probability of future losses. Establishing insurance premiums that reflect individual farm risks is necessary to minimize adverse selection. If, for example, premiums represented average risk levels, then high-risk farmers would be encouraged to participate and low-risk farmers would not. The program would be collecting premiums for average risks and paying out indemnities on high risks. This would be costly.

Production risks, which are half of the revenue equation, can be predicted with reasonable accuracy on the basis of existing farm or county yield data. Price risks are another matter, however. Using yield data, one can estimate average revenue per acre and year-to-year variability from state price data. But because of the number of variables affecting prices, not the least of which is government policy, such revenue data may generate inaccurate predictions about the probability of losses. To address this problem, revenue data based on recent history would have to be examined carefully in the initial stages of implementation. As individual farm observations accumulated over time, this problem would be lessened.

A critical insurance problem lies in the fact that the incidence of price risks is not independently distributed among farmers. In other words, prices received by one farmer are typically closely aligned with prices received by others: a decline in corn prices because of an unanticipated drop in exports is felt by all farmers selling corn. Such a decline could make all insured farmers eligible for indemnity payments. Since the objective of farm revenue insurance is to provide protection against such declines, the cyclical pattern in agriculture could mean that in some years the program would pay out to a great majority of insured farmers and in others to very few. This could lead to variable participation from year to year, since in years when the market outlook was negative farmers would have greater incentive to participate than in years when the outlook was positive. In order for the program to work, farmers would have to participate on a multiyear rather than a year-to-year basis. They could be encouraged to do so through incentives such as premium discounts for multiyear contracts.

There are also "moral hazards" stemming from the behavior of the insured. Under certain conditions a farmer might be able to reduce his yields in order to profit from the indemnity. For example, if wet weather delayed corn planting past the optimum date, a farmer might plant the crop anyway but not fertilize it. The yield would be low, but he could claim the indemnity because of poor weather. This hazard could be minimized by basing expected revenues on average individual farm yields so as to penalize those who deliberately lowered their yields by reducing the level of insurance protection they would receive in future years. From the farmer's perspective, on the other hand, government actions could influence the expected returns to insurance. For example, if farmers believed that the government would build a reserve, thereby increasing prices, participation in revenue insurance would be less attractive.

Farmer Participation. To make revenue insurance viable, a relatively large number of farmers would have to participate. This would require that farmers understand the advantages of the program and that they be able to pay the premiums.

Farmers' perceptions of the necessity for revenue insurance would depend on their attitude toward risk, the alternatives available to them (such as forward pricing), and the economic characteristics of their businesses (extent of diversification, financial reserves, etc.). In general, those farmers who are most vulnerable to farm income variability would be most likely to want revenue insurance. These would include farmers dependent on the income from farming (such dependency increases with farm size); farmers with substantial debt-to-asset ratios; and new entrants. Clearly, not all farmers would have the desire to buy insurance; but not all would have to participate in order to have an acceptable pooling of risk.

Second, farmers would have to be able to pay the insurance premiums. This means that premiums should be as low as possible relative to the level of protection, and that long-term expected benefits should be attractive relative to costs. Premiums that reflect the full cost of providing farm revenue insurance would probably discourage many farmers from participating. Indeed, it seems likely, as evidenced by the subsidization of federal crop insurance, that premium subsidies would be necessary to encourage sufficient participation in revenue insurance. Such premium subsidies can be defended on the ground that society would benefit by sharing farming risks. An argument against them is that if the subsidies became substantial the program would reward inefficiency and become an income transfer program rather than insurance against income fluctuations.

## CONCLUSION

This examination does not lead to a definite conclusion about the feasibility of farm revenue insurance as a replacement for, or a complement to, current programs. It has focused on only one type of insurance program, but its inferences are probably applicable to other insurance schemes.

A workable revenue insurance program would have to deal adequately with standard insurance problems such as (1) the measurement of risks and prediction of losses; (2) adverse selection; (3) moral hazards; and (4) farmer participation. If it met these problems, revenue insurance could be an effective policy for reducing the risk and income instability in crop farming.

If revenue insurance was used as a replacement for current commodity stabilization programs, crop prices would probably be less stable than at present. The instability could be handled by establishing reserves, with less government intervention than under current programs.

Revenue insurance would probably accomplish its purpose of protecting crop farmers against fluctuating incomes at less cost to taxpayers than current stabilization programs. Revenue insurance could not be expected to raise the average level of farm income over time. This means that it would work best in a scenario where export markets grew at a rate sufficient to utilize U. S. production capacity. In the long term, average incomes would generate adequate returns to resources, but from year to year they would be highly variable. Revenue insurance would help to reduce income instability by dampening sharp declines in revenues. In a long-term scenario of sluggish export growth, excess production capacity, and low but stable prices and incomes, revenue insurance would be less effective.

This examination suggests that revenue insurance has sufficient merit as a policy alternative to warrant further study. The Congress could undertake two initiatives. First, it could authorize additional studies of revenue insurance, including program design and implementation. Second, it could authorize a pilot revenue insurance program in selected areas to see how it would work in practice. A recent task force on farm income protection insurance recommended a three-year pilot program for that purpose, limited to a single commodity. <sup>4/</sup>

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4. U. S. Department of Agriculture, Farm Income Protection Insurance, A Report to the United States Congress (June 1983). This report looked at several approaches to insuring incomes.





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**APPENDIX**

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## APPENDIX.      FORWARD CONTRACTING

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This appendix briefly describes how farmers use futures markets to lock in prices for their crops. It also examines commodity futures options.

### FUTURES MARKETS

Futures markets offer the farmer an opportunity to sell his crop in advance at a price that is reasonably certain. In the basic hedging transaction, a farmer acts to lock in a specific price for part of his crop in advance of harvest. For example, a corn farmer in July decides that a local price of \$2.55 per bushel would guarantee a good profit on a portion of his crop. To lock in this price he sells a December futures contract at the current July price of \$3.08 at Chicago. In doing so he commits himself to deliver corn at the contract price at the end of the contract month.

By early December, when the farmer actually sells his corn to a local elevator, the cash price has dropped by \$0.35 (from \$2.55 to \$2.20 per bushel). The farmer liquidates his futures position by buying back the contract at \$2.73 per bushel, earning \$0.35 per bushel--the difference between the \$3.08 per bushel at which he had contracted to sell the corn and the \$2.73 per bushel it cost to buy the contract back. As a result of these transactions, the farmer earns a net effective price of \$2.55 per bushel (\$2.20 cash price plus \$0.35 on futures). In this simple example, the farmer achieves his price objective of \$2.55 per bushel, since his gain in the futures market offsets the decline in cash prices between July and December. However, he is still exposed to what is called "basis risk"--the risk that local cash prices and futures prices will not track together for a time.

In a hedging transaction, a farmer is also exposed to margin calls--the need for additional cash to cover the futures transaction if futures prices move against him. In the above example, the farmer would be required to put up cash equal to perhaps 5 percent of the value of the contract. If the price of the December contract increased from \$3.08 per bushel, then the farmer would have to put up more cash to maintain his margin. He would then be exposed to the risk of establishing a larger futures position than needed. In this case, he becomes a speculator in the excess contract and is at serious risk.

## COMMODITY FUTURES OPTIONS

In 1982, the Congress passed legislation lifting the statutory prohibition on agricultural commodity options trading. <sup>1</sup>/ This legislation leaves it to the discretion of the Commodity Futures Trading Commission whether to proceed with pilot projects for agricultural commodity futures options. If functional commodity options markets eventually develop, crop farmers and other businessmen will have access to another risk-management tool.

Commodity futures options would allow a farmer to trade put or call options on futures contracts. The buyer of a put option has the right--not an obligation--to sell a futures contract for a specific month at a fixed price (the strike price) on or before a given date. The price of the option, called the premium, is fixed and therefore the buyer's liability is limited to the premium. If the sale of the underlying commodity futures contract at the option's strike price turns out to be unprofitable, the option is abandoned.

The most likely way a corn farmer would use commodity futures options to reduce price risk is by purchasing a put option on a futures contract. This transaction would give the farmer the right to sell and deliver, at some time in the future, a specific quantity of corn at a fixed price. The fixed futures price, net of delivery costs, would translate into an effective cash price. If the cash price declined to less than the futures contract price (less delivery costs), the farmer could exercise the right to sell and deliver under the terms of the futures contract. Or, since the premium for the put option would likely increase as cash prices declined, the farmer could sell the option; the profit on this transaction plus the cash price would increase his effective price. For either choice--dependent upon net returns and the practicality of physical delivery under the futures contract--the farmer would be assured a minimum price. On the other hand, if the cash price rose above the futures contract price, the farmer would not exercise the option and it would expire. In that case, for the cost of the option premium, he would have assured himself a minimum price but kept the opportunity to gain from increases in cash prices.

The distinction between this and hedging via a futures contract is important. The commodity futures option transaction limits the farmer's downside price risk by fixing a minimum price for his corn; but it does not preclude him from profiting in the event of price increases in the cash market. In contrast, hedging via a futures contract results in the gain (loss)

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1. The Commodity Futures Trading Commission reauthorization legislation.

in the futures market being roughly offset by the loss (gain) in the cash market. Through the options transaction, the farmer captures all the increase in the cash price, net of the option premium.

In addition to their use as price insurance, commodity futures options can also be used as insurance against uncertain output. For example, if a farmer forward contracts all of his expected crop, he is exposed to the risk of a production shortfall that would prevent full delivery. By purchasing a call option for some portion of the expected crop, the farmer can be assured of having an adequate supply to meet his delivery contract. In the event of a short crop, he can exercise the option to purchase and receive delivery under the futures contract.

In brief, commodity futures options will offer farmers an additional way to reduce price and income risks by transferring the risks to others. As compared to futures contracts, options may have some advantages. First, a purchased option may be used to assure a minimum price for an anticipated sale of a commodity in the future (price insurance) or to protect the value of an uncertain future level of commodity production at a known cost. The maximum loss on an option transaction is the premium. Second, purchased options involve no margin calls; the option premium is paid when the option is purchased and no other payments need be made during the life of the option. In contrast, futures positions may generate margin calls that could cause liquidity problems for hedgers.

#### FORWARD CONTRACTING AND PUBLIC POLICY

Commodity futures options, if markets develop sufficiently, will expand the forward contracting alternatives available to crop farmers. If this led farmers to make greater use of forward contracting in cash or futures markets, it might diminish the importance of federal commodity programs. That is, if farmers became more inclined to transfer risks to others in the private sector, they would have less need for commodity programs.

The alternatives are not mutually exclusive, however. Forward pricing serves to reduce price risks no more than one year ahead. In contrast, commodity programs reduce price risks for a longer period by generally assuring farmers that nominal minimum prices for future crops will be no less than current loan rates. In short, forward contracting permits a farmer to reduce price risks within a crop year while commodity programs act to reduce longer-term risks. Since farmers make investment decisions on the basis of long-term price and income expectations, they are interested in

reducing risks over more than a one-year period. This means that existing forward contracting tools, including potentially useful commodity future options, are not complete substitutes for commodity programs. <sup>2/</sup>

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2. It has been suggested that the federal government could make commodity options a more viable tool for crop farmers by writing longer-term put options. Such a policy would help to reduce longer-term price and income risks. See Bruce Gardner, The Governing of Agriculture (The Regents Press of Kansas, 1981), pp. 108-12.